

The School of Hard Knocks: The Development of Close Air Support in Burma during the Second World War

A Monograph

by

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Abstract

The School of Hard Knocks: The Development of Close Air Support in Burma during the Second World War, by Major Patrick B. Lysaght, 54 pages.

Effective close air support (CAS) requires genuine cooperation from both air and ground forces. Many US military planners take the existing CAS system for granted, but history reveals reliable CAS capabilities require unique capabilities, joint training, and cohesive doctrine to succeed in a dynamic combat environment. This analysis explores the roots of modern CAS in Burma during World War II. By contrasting the efforts of the American Volunteer Group in 1942 with the Eastern Air Command in 1943-1944, the Burma campaigns showcase key CAS challenges, and highlight the Eastern Air Command's innovative solutions. In particular, the case studies focus on four CAS evaluation criteria: responsiveness, effectiveness, integration, and doctrine. Finally, a comparison between the 1943-1944 campaign and current doctrine reveals how the lessons learned in Burma paved the way for modern CAS.

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Acronyms

AVG	American Volunteer Group
CAOC	Combined Air Operations Center
CAS	Close Air Support
CBI	China-Burma-India
EAC	Eastern Air Command
FM	Field Manual
JP	Joint Publication
JTAC	Joint Terminal Attack Controller
RAF	Royal Air Force
SEAC	South East Asia Command
US	United States
USAAF	United States Army Air Force

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Introduction

In the summer of 2006, insurgent gunfire pinned down a supply convoy bound from Basra to Baghdad. A British Joint Terminal Attack Controller (JTAC) in the convoy contacted his higher headquarters requesting assistance. In less than thirty minutes, a US Air Force F-16, flown by the author, conducted a high-speed, low-altitude demonstration of force. The gunfire ceased, the insurgents dispersed, and the convoy completed its mission without any loss of life.

The JTAC expected, but could not witness, the storm of activity caused by his request. Initially, the request traveled up the British chain of command to the Land Component Command headquarters. From there, the request became a tasking sent to the Combined Air Operations Center (CAOC). In turn, the CAOC contacted both the local Army unit controlling the closest fighters and a KC-10 refueling platform. The air-land command and control structure allowed the F-16s to refuel as they moved from Mosul (about 300 miles to the north) to help the convoy.

From start to finish, this example demonstrates the responsiveness, effectiveness, integration, and rigorous doctrine of modern Close Air Support (CAS). While many in the US military take it for granted, effective CAS developed from the blood-soaked lessons of history. This monograph argues modern CAS first appeared during the Burma campaigns of WWII. The Allied coalition pioneered effective CAS in 1943-1944 as Eastern Air Command (EAC) solved problems identified by the American Volunteer Group (AVG) in 1942. EAC's doctrine, procedures, and techniques laid the foundation for modern CAS.

The China-Burma-India (CBI) Theater pitted a coalition of British, Indian, and Chinese ground forces, supplemented by British and American airpower, against the Imperial Japanese Forces.¹ The CBI Theater's terrain included dense rainforest, Himalayan Mountains, and the key junction between the Indian and Pacific Oceans. Thus, the CBI Theater contained the only available ground, air, and sea lines of communication and supply between China and the other

¹ William Slim, *Defeat into Victory: Battling Japan in Burma and India, 1942-1945* (New York: Cooper Square Press, 2000), 12-16.

Allied Powers.² The Japanese Army invaded Burma in 1942 in order to sever these critical nodes while simultaneously bolstering its own lines of supply within Southeast Asia.³

The presence of American airpower in the CBI Theater began with President Roosevelt's authorization of the American Volunteer Group (AVG) in April 1941.⁴ This group consisted of American pilots and maintenance crews released from the American military in order to serve as mercenaries in support of the Chinese Army. With materials supplied via a Lend-Lease agreement, Generalissimo Chiang Kai-Shek, through Colonel Claire Chennault, commanded the AVG's operations. In the first half of 1942, the AVG supported the British and Chinese defense of, and retreat through, Burma.⁵

In July 1942, the US Army Air Force (USAAF) nationalized the AVG, created new units, and provided additional resources.⁶ By August 1943, the Allies established the South East Asia Command (SEAC) under British Admiral Louis Mountbatten.⁷ SEAC took command of the augmented US presence in the CBI Theater, created an integrated Royal Air Force (RAF) – USAAF force named the Eastern Air Command (EAC), and oversaw the air-land cooperation during the Allied counter-offensive into Burma throughout 1943 and 1944.⁸ The EAC, with subordinate units like the 10th Air Force, pioneered CAS techniques that provided key integration

² Claire Lee Chennault, *Way of a Fighter: The Memoirs of Claire Lee Chennault*, ed. Robert Hotz (New York: G.P. Putnam's Sons, 1949), 98.

³ Slim, *Defeat into Victory*, 14.

⁴ Charles R. Bond, Jr. and Terry Anderson, *A Flying Tiger's Diary* (College Station: Texas A&M University Press, 1984), 12.

⁵ Slim, *Defeat into Victory*, 5-7.

⁶ Chennault, *Way of a Fighter*, 176-177.

⁷ Slim, *Defeat into Victory*, 168.

⁸ Charles F. Romanus and Riley Sunderland, US Department of the Army, Office of the Chief of Military History, United States Army in World War II, China-Burma-India Theater, *Stilwell's Command Problems* (1956), 6-7.

with ground forces, and targeted Japanese lines of communication into Burma.⁹ In WWII, this offensive secured the air and land lines of communication required to sustain the Chinese Army. Beyond the Second World War, the employment of the Eastern Air Command demonstrated the foundational principles upon which effective CAS rests.

Two case studies utilizing these four criteria provide for the evaluation of evidence in support of the thesis: 1) CAS responsiveness measured through air-ground communication; 2) CAS effectiveness quantified through Japanese targeting, Japanese tempo, and friendly freedom of maneuver; 3) CAS integration reflected in command relationships and planning; and 4) the development of CAS doctrine. The first case study examines the struggles of the AVG to support Allied armies during the Japanese invasion of Burma in 1942. In particular, this case study documents the unclear command relationships within the CBI Theater, pre-war doctrine that marginalized CAS, and the AVG's largely ineffective attempts at early CAS employment. Additionally, the War Department's post-war interviews with Japanese military leaders in Burma identify losses, logistics, and targeting in order to confirm any noticeable CAS impact.

The second case study surveys Eastern Air Command's efforts to improve CAS during the Allied counterattack into Burma. Specifically, the analysis identifies how command relationships changed with the arrival of increased airpower in the CBI Theater, how CAS doctrine adjusted to the reality of war, and what new techniques the EAC employed to achieve closer integration with ground forces. Also, an analysis of Japanese interviews from the 1943-1944 campaign indicates both declining Japanese logistical capabilities due to increased air strikes, and the growing importance of CAS to Allied ground commanders at all levels. The striking progression between these case studies demonstrates likely parallels between CAS in Burma during the Second World War and modern CAS doctrine as employed in the opening vignette to this introductory section.

⁹ Owen R. Allred (Captain), US War Department, 80th Flying Training Wing Historian, *Dive Bombing Tactics Used by 88th Fighter Sq at Myitkyina* (11 October 1944), 7-10.

Anyone interested in further reading on the development of CAS in the CBI Theater should consider pursuing three avenues of research materials. For readers unfamiliar with the Burma campaigns, the three volume CBI Theater subset of the *US Army in World War II* series by the Office of the Chief of Military History provides an excellent overview at the theater command level.¹⁰ A second critical research avenue showcases the tactical level of war through personal accounts of the men who fought in Burma. In particular, Chennault's *Way of a Fighter*, Slim's *Defeat Into Victory*, Bond's *A Flying Tiger's Diary*, and *Stilwell's Papers* allow the reader to glimpse how men struggled, hoped, and overcame enormous hardship in the CBI Theater. Similarly, the Air Force Historical Research Agency maintains interviews of the AVG pilots as they returned from the CBI in 1942. Uniquely, access to unpublished correspondence from pilots in the 88th Fighter Squadron summarizing their time in Burma during 1944 supports the analysis herein, made available through the 80th Flying Training Wing historian.¹¹ Finally, Japanese Monographs fifty-seven through sixty-four, produced after World War II by the US Far East Command, provide excellent insight into the operational planning, decision-making, and reactions of the Japanese air and ground forces to improving Allied air power in Burma.¹² Together, these three research branches paint a compelling picture of the birth of modern CAS.

Section 1: Trouble In Burma

Military historians often call defeat history's greatest tutor. For the Allies in World War II, the Japanese invasion of Burma stood as yet another discouraging defeat at the hands of the Axis powers. The defeat in Burma, however, represented the first time American pilots in American airplanes watched as enemy air and land forces overwhelmed friendly ground troops.

¹⁰ Romanus, *Stilwell's Command Problems*, vii.

¹¹ Allred, *Dive Bombing Tactics*, 1.

¹² Shore Terakura (Major General) et al, US Department of the Army, Office of the Chief of Military History, US Army Far East Command, 1st Demobilization Bureau, *Japanese Monograph Nos. 57-64* (August through October 1946).

Accordingly, this experience dramatically reshaped the way the United States approached CAS. To fully grasp Burma's impact on CAS, this section addresses how the defense of Burma fits into the context of World War II, gives a historical overview of the Allied effort in Burma, examines the AVG's CAS effectiveness through the four CAS criteria, and highlights five key CAS challenges identified in the 1942 defense of Burma.

Japan's invasion of Burma on 15 January 1942 marked the next logical step in Japan's attempt to control the south Pacific.¹³ Controlling Burma supported this attempt in three key ways. First, Japan required resources to fuel its war industry, and conquering Burma solidified Japanese control over both key oilfields and the Straits of Malacca.¹⁴ Second, Burma contained the last air, land, and sea lines of communication to Free China.¹⁵ After invading China in 1937, Japan failed to force the Chinese to surrender. The Japanese believed interrupting Allied supplies to China could break the Chinese Army, force China to surrender, and free Imperial Army forces for use in other theaters. Third, Burma provided the Japanese key transportation assets, and a staging area for an attack into India.¹⁶ As the crown jewel of the British Empire, capturing India would have delivered a devastating psychological blow to the Allies.¹⁷ Also, controlling India meant Japanese access to critical resources throughout the Indian Ocean. These three strategic interests convinced the Japanese to invade Burma with a significant concentration of forces.

In contrast, Burma received the lowest priority in the Allied war effort before the Japanese invasion. Throughout 1941, British priorities focused on maintaining critical supply lines to the United States, fighting German forces in North Africa, and defending Singapore

¹³ Jack Belden, *Retreat with Stilwell* (New York: Alfred A. Knopf, March 1, 1943), 18.

¹⁴ Laughlin Currie, US Department of the Air Force, Air Force Historical Research Agency, *Memorandum for President Roosevelt* (9 December 1941).

¹⁵ Chennault, *Way of a Fighter*, 98.

¹⁶ Currie, *Memorandum for President Roosevelt*.

¹⁷ Belden, *Retreat with Stilwell*, 17-18.

against the Japanese. America, still reeling from Pearl Harbor, had not yet mobilized a deployable force. Intense fighting on the Eastern Front occupied Russia. Only the Chinese, who depended on the Rangoon port for critical supplies, recognized Burma's importance to the wider war effort.¹⁸

As a result, the kindest description of the Allied force arrayed in Burma to stop Japan's Fifteenth Army is forgotten. In fact, responsibility for planning, overseeing, and resourcing Burma's defense passed, unnoticed and unchanged, between five different British Headquarters in the sixteen months leading up to January 1942.¹⁹ Furthermore, the separation of administrative control of Burmese forces (in London) from operational control (moving between England, India, Australia, and Singapore) prevented cohesive application of the little resources allocated to Burma.²⁰ Worse, Britain rejected Chinese efforts to commit seventy thousand elite troops to Burma's defense out of fears the Chinese presence might trigger a Japanese invasion.²¹ When the fighting started, the entire Allied defense of Burma included the 17th Indian Division (hastily assembled in India and then dispersed east to west across Burma), 1st Burma Division (mostly untrained Burmese stationed along the north-south Rangoon-Mandalay railway), two obsolete RAF squadrons (one fighter, one bomber), and one squadron of P-40Bs from the AVG.²²

The formation and deployment of the AVG highlighted the chaotic nature of the Allied approach to Burma. Approved by President Roosevelt to purchase aircraft and to recruit pilots in February and April of 1941 respectively, Colonel Claire Chennault formed the AVG on behalf of Generalissimo Chiang Kai-Shek of China.²³ Originally designed to create an American-style air

¹⁸ Chennault, *Way of a Fighter*, 99.

¹⁹ Slim, *Defeat into Victory*, 10-11.

²⁰ Ibid.

²¹ George McMillen, US Department of the Air Force, Air Force Historical Research Agency, *Interview* (5 November 1942), 10.

²² Slim, *Defeat into Victory*, 5, 12.

²³ Chennault, *Way of a Fighter*, 100-102.

force in China, only the first of the three planned AVGs actually reached China. The ninety-nine P-40Bs, one hundred pilots, and essential maintenance professionals reached Rangoon, Burma on 28 July 1941.²⁴ After Chennault's regimented training program at Toungoo in northern Burma, the AVG deployed one squadron to Mingaladon (near Rangoon), and two squadrons to Kunming, China on 12 Dec 1941. Thus, American pilots under Chinese leadership positioned themselves on a British-controlled airfield in Burma to intercept the first Japanese air raid in Rangoon on 23 December 1941 (less than three weeks after Pearl Harbor).²⁵

Facing this meager defensive force scattered throughout Burma, Japan's Fifteenth Army represented a well-equipped, well-led, battle-tested organization. Following the Japanese annexation of Thailand, the Fifteenth Army assembled along the Burmese border.²⁶ The invasion force included the 55th Division, the 33rd Division, the 5th Air Division, extra mortar companies, and several mobile wireless platoons.²⁷ In mid-January 1942, the Japanese launched their attack into Burma (see Figure 1). The complete lack of British intelligence on Japanese movements allowed the Japanese to exploit the lightly defended Kaw Kareik Pass, cut the main British line of communication, and almost encircled the entire British force.²⁸ In the resulting chaos, the British retreated to the Sittang River in an effort to defend Rangoon, destroyed the bridge to prevent a Japanese crossing, and stranded a large portion of their own force on the far side of the river.²⁹

²⁴ Chennault, *Way of a Fighter*, 107.

²⁵ *Ibid.*, 129-130.

²⁶ *Ibid.*, 120.

²⁷ Shore Terakura (Major General), US Department of the Army, Office of the Chief of Military History, US Army Far East Command, 1st Demobilization Bureau, *Japanese Monograph No. 57, Burma Operations Record, Phase I: Nov. 1941 – Dec. 1942* (August 1946), 11-13, & 25.

²⁸ Slim, *Defeat into Victory*, 13.

²⁹ *Ibid.*, 13-16.

While holding the defensive line in front of Rangoon, the British allowed the Chinese forces led by US Army General Joseph Stilwell to enter Burma. Generalissimo Chiang Kai-shek, however, distrusted the British, expected them to retreat quickly, and restricted General Stilwell's

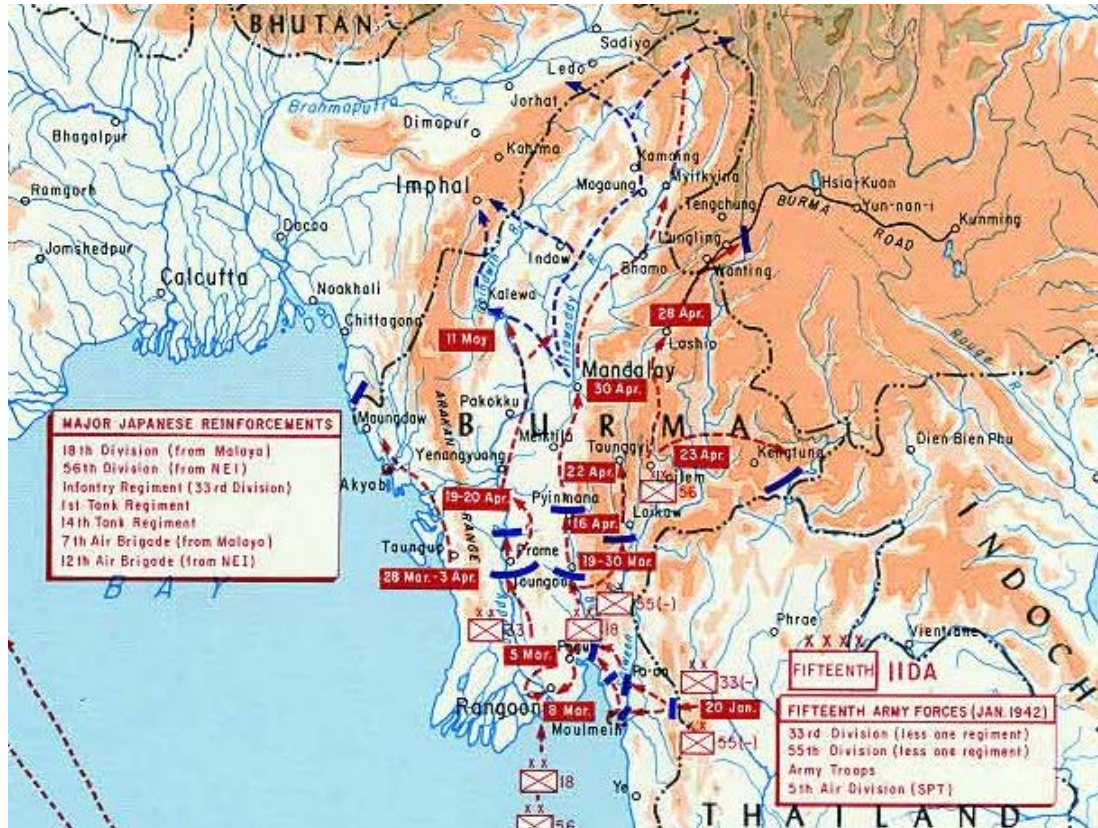


Figure 1: Map of 1942 Japanese Invasion of Burma

Source: US Military Academy History Department, "Southern Asia 1941: Japanese Centrifugal Offensive," accessed December 1, 2014, <http://www.westpoint.edu/history/SiteAssets/SitePages/World%20War%20II%20Pacific/ww2%20asia%20map%2011.jpg>.

ability to maneuver the Chinese armies into a defensible position.³⁰ These delays compromised Stilwell's counterattack plan. Meanwhile, the Japanese captured Rangoon, sent British forces north to Magwe, and conducted an operational pause to incorporate reinforcements fresh from the Japanese victory on Singapore.³¹ These high-spirited Japanese forces included two divisions, two

³⁰ Joseph W. Stilwell, *The Stilwell Papers*, Schocken Edition, ed. Theodore H. White (New York: Schocken Books, 1972), 50-54.

³¹ Chennault, *Way of a Fighter*, 137.

tank regiments, two artillery regiments, and two engineer regiments.³² In the air, the Fifteenth Army received more than 150 new aircraft and crews.³³ They established these forces at the newly acquired Mingaladon airfield in order to better support their operations in Burma.³⁴

Major air attacks on Magwe heralded a new Japanese offensive on 28 May 1942.³⁵ By 15 April, the British front collapsed.³⁶ On 20 April, the Japanese destroyed the Chinese eastern flank, penetrated secondary defenses, and cut the line of retreat into China.³⁷ The surviving Allied ground forces scattered into the Burmese jungle for a piecemeal retreat into India. The British lost thirteen thousand soldiers in this retreat, and cited four causes for the disaster: 1) poor preparation with confused command relationships, 2) the small size of the Allied air force, 3) the jungle environment with tough terrain, and 4) very aggressive Japanese envelopment tactics bent on the encirclement and destruction of Allied forces.³⁸

Before Burma fell into Japanese hands, pilots of both sides waged an intense air campaign against each other, and in support of their ground forces. Initially, thirty-five Allied aircraft from the AVG and RAF faced one hundred fifty Japanese.³⁹ By March, the Allies received no reinforcements, and the Japanese count rose to more than four hundred planes.⁴⁰ Despite these overwhelming odds, Allied air power made a powerful impact. During the ten

³² Terakura, *Japanese Monograph No. 57*, 26-27.

³³ Daniel Ford, *Flying Tigers: Claire Chennault and the American Volunteer Group* (Washington: Smithsonian Institution Press, 1991), 223 & 263.

³⁴ Terakura, *Japanese Monograph No. 57*, 25.

³⁵ Stilwell, *The Stilwell Papers*, 70.

³⁶ *Ibid.*, 85.

³⁷ *Ibid.*, 90.

³⁸ Slim, *Defeat into Victory*, 115-118.

³⁹ *Ibid.*, 7.

⁴⁰ *Ibid.*

weeks they defended Rangoon, the AVG shot down 217 enemy aircraft (plus forty-three unconfirmed kills) in exchange for losing only six pilots and sixteen airplanes.⁴¹ As the Japanese advanced through Burma on 27 February 1942, the AVG moved from Mingaladon to Magwe, and continued defending northern and central Burma.⁴² On 22 March, the AVG relocated to its home bases in China as the Japanese completed their conquest of Burma.⁴³

During the defense of Burma, AVG actions created one of the few bright spots for the Allies in the midst of very dark period at the beginning of 1942. First, the persistent AVG defense of Mingaladon and Magwe inflicted heavy losses on Japanese bombers, caused the Japanese to increase the fighter : bomber ratio by lowering the number of bombers, and, therefore, eased air attacks on Allied ground forces.⁴⁴ Second, the AVG's raid targeting Chiengmai airfield on 21 March 1942 forced the Japanese to waste fighters defending bases, reopened British aerial evacuation routes through Magwe airfield, and earned British Air Vice Marshal D. F. Stevenson's glowing report: "In the Burma campaign the main brunt of the fighting was borne by the P-40 squadrons of the American Volunteer Group. They were first in the field with pilots well trained, and good fighting equipment. The great majority of enemy aircraft destroyed in Burma fell to their guns. Their gallantry in action won the admiration of both services."⁴⁵

While the AVG accomplished a peerless aerial record in the defense of Burma, they failed to provide the CAS required by British and Chinese forces to halt the Japanese offensive. The CAS criteria introduced earlier provide insight into how the AVG's support fell short of ground force requirements. This analysis reveals unresponsive CAS due to deficient air-ground

⁴¹ Chennault, *Way of a Fighter*, 130-131.

⁴² *Ibid.*, 139.

⁴³ *Ibid.*, 146.

⁴⁴ *Ibid.*, 133-135.

⁴⁵ *Ibid.*, 146-148.

communications, disastrous CAS effectiveness with regards to friendly tempo, only intermittent CAS integration at the command or staff levels, and giant gaps in CAS doctrine and procedure.

CAS responsiveness requires communication between ground troops and the aircraft supporting them. This communication takes many forms. Radio, coordinated visual signals, and preplanned terrain or time limitations allow ground and air forces to work in concert to achieve their mission.⁴⁶ All these methods, however, require both parties to participate. When they work together, ground and air forces protect themselves, concentrate effects on the enemy, and create a system capable of adapting to the ever-changing reality of the battlefield. On the other hand, unresponsive CAS, characterized by little or no communication between ground and air components, produces minimal effects at best, and friendly-fire (called fratricide) events at worst.

Several realities hindered the AVG's ability to establish cohesive communications with British and Chinese ground forces in Burma. First, AVG aircraft radios did not interface with frontline ground force wireless sets for two reasons. Initially, the British decided not to release their encryption codes to the AVG.⁴⁷ Later, the weak radio connection caused one AVG pilot to say, "You could get no information from either the squadron leader or the ground."⁴⁸ As a result, pilots only conducted intermittent, real-time, 2-way communication with headquarters units at their home airfields of Mingaladon, Magwe, or Kunming. Second, institutional prejudices on all sides inhibited ground communication channels. During the critical defense of Rangoon, one AVG pilot reported to Chennault, "Our only contact with British Intelligence was a visit from one officer about ten days ago. There seems to be little co-operation between the R.A.F. and British

⁴⁶ Joint Publication (JP) 3-09.3, *Close Air Support* (Washington, DC: Government Printing Office, 2009), ix-x.

⁴⁷ Chennault, *Way of a Fighter*, 119.

⁴⁸ George Paxton, US Department of the Air Force, Air Force Historical Research Agency, *Interview* (25 August 1942), 10.

Army and less between the R.A.F. and us.”⁴⁹ In fact, the RAF abandoned Mingaladon without informing the AVG detachment on 27 February.⁵⁰ Similarly, General Stilwell (commander of the Chinese ground forces in Burma) and Colonel Chennault (AVG commander) both recorded March 21 as their only meeting before the fall of Burma in which they coordinated preparations for upcoming operations.⁵¹ Chinese field forces experimented with crude panel signals, but miscommunication caused fratricide as pilots strafed friendly forces.⁵² Interestingly, none of the AVG personnel interviewed after the AVG’s induction into the USAAF in 1942 mentioned any direct communication with ground units.⁵³ Furthermore, many pilots disliked the ground-cooperation missions due to the increased risk from enemy fire, ricocheting bullets, and increased vulnerability to enemy aircraft.⁵⁴ The unarmored, liquid-cooled engine of the P-40B remained particularly vulnerable.⁵⁵ Given the total lack of spare parts between October 1941 and March 1942, engine damage posed a significant risk.⁵⁶ These risks manifested when several pilots effectively shot themselves down with bomb fragments after the arrival of the P-40E.⁵⁷ Clearly, the communications failure between the AVG, the RAF, the British Army, and the Chinese Army hindered efforts to provide CAS responsive to the needs of the combined force.

⁴⁹ Chennault, *Way of a Fighter*, 139.

⁵⁰ Ibid.

⁵¹ Stilwell, *The Stilwell Papers*, 69.

⁵² Chennault, *Way of a Fighter*, 154.

⁵³ Bond, *A Flying Tiger’s Diary*; McMillen, *Interview*; Cooper, *Interview*; Freeman, *Interview*; Paxton, *Interview*; Baumler, *Interview*; & Frillman, *Interview*.

⁵⁴ Ford, *Flying Tigers*, 185.

⁵⁵ Albert J. Baumler, US Department of the Air Force, Air Force Historical Research Agency, *Interview* (24 March 1943), 5.

⁵⁶ Chennault, *Way of a Fighter*, 118.

⁵⁷ McMillen, *Interview*, 4.

CAS effectiveness measures the tangible effects of CAS sorties. CAS offers several different measures of performance at different levels of warfare. For example, tactical metrics could focus on targets destroyed, bomb tonnage dropped, or number of sorties flown. Strategic evaluations might analyze the allocation and apportionment of CAS sorties, the deployment of specific CAS capabilities into a given conflict, or the impact of CAS employment on strategic information operations. In between, the operational level examines the way CAS shapes the overall trend of the campaign by isolating effects on both friendly and enemy forces. This analysis evaluates CAS effectiveness by identifying trends within enemy targeting, enemy tempo, and friendly freedom of maneuver.

In terms of these three measures of CAS effectiveness, the AVG and RAF failed on all counts. As described earlier, the AVG attracted focused attacks at both Mingadalon and Magwe.⁵⁸ While these attacks spared friendly forces, they represented only 8 of the approximately 102 days of active air war in Burma (ended on 4 April 1942).⁵⁹ Furthermore, the Japanese attacks destroyed, or forced out of Burma, all friendly air assets after 23 March 1942.⁶⁰ After this date, the Japanese controlled key airfields throughout Burma, and launched attacks against both retreating ground forces and the vulnerable “Hump” airlift to China.

Similarly, AVG and RAF efforts to slow the Fifteenth Army’s tempo achieved only fleeting success. The Japanese complicated the AVG’s task by intentionally utilizing pack animals to ferry supplies across the Thailand-Burma border under the natural cover of the incredibly thick, Burmese jungle.⁶¹ While slow, this method precluded detection and attack by AVG and RAF forces. Writing after the war, Major General Shore Terakura (member of the Fifteenth Army’s general staff) recalled the enemy air’s only impact on the invasion’s progress as

⁵⁸ Chennault, *Way of a Fighter*, 133-135, 145-146.

⁵⁹ Stilwell, *The Stilwell Papers*, 98.

⁶⁰ Chennault, *Way of a Fighter*, 147-148.

⁶¹ Terakura, *Japanese Monograph No. 57*, 13.

a temporary restriction to night movement between the Kaw Kareik Pass and the capture of Rangoon.⁶² Unfortunately, the Japanese crossing of the Sittang River compromised the security of the Rangoon airfields, and forced both the AVG and RAF to retreat to Magwe. Also, technology and numbers restricted Allied ground attack capacity. The British stationed the Blenheim bombers in Burma during the 1930s because they were obsolete, inaccurate, and slow.⁶³ Additionally, the only air-to-ground weapons carried by the AVG's P-40Bs included two .50 caliber cannons and 4 smaller machine guns.⁶⁴ In fact, the AVG's only significant ground impacts occurred during the 23 March 1942 strafing raid on Chiengmai airfield, and against Japanese exploiting forces near the Salween River on 7 May, 1942.⁶⁵ By this time, the AVG received the upgraded P-40E Kittyhawk, and improvised a bomb rack capable of carrying a 570 pound high explosive bomb.⁶⁶ The AVG employed these bombs to great effect on the Japanese mechanized column and bridging assets crossing the Chinese border at Loi-Wing.⁶⁷ While effective in stopping the Japanese advance, the total lack of friendly ground forces in the area made this attack more interdiction than CAS. Overall, the AVG did not appreciably slow the Fifteenth Army's advance during the 1942 invasion of Burma.

The final element of CAS effectiveness considered here includes the CAS impact on friendly freedom of maneuver. In this area, the AVG catastrophically failed. On 21 February, British Air Vice Marshal Stevenson ordered AVG and RAF pilots to attack a Japanese convoy moving south toward Kyaikto.⁶⁸ The AVG squadron conducted two sorties against the only

⁶² Terakura, *Japanese Monograph No. 57*, 20-21.

⁶³ Slim, *Defeat into Victory*, 5.

⁶⁴ Ford, *Flying Tigers*, 51.

⁶⁵ Chennault, *Way of a Fighter*, 147-148, 166-167.

⁶⁶ *Ibid.*, 164.

⁶⁷ *Ibid.*, 165-167.

⁶⁸ Ford, *Flying Tigers*, 228.

column in the vicinity of Kyaikto using their guns to destroy more than fifty trucks.⁶⁹

Unfortunately, the convoy actually consisted of the entire 17th Indian Division's hospital and transportation assets moving north. The RAF and AVG attacks killed 160 soldiers, and forced the division to retreat through Burma on foot.⁷⁰ This fratricide originated in poor British command and control, but the AVG's lack of communication prevented them from forestalling the tragedy. To be fair, the AVG did successfully strafe exposed Japanese on a few occasions, but not at the request of any ground commander. In all three aspects of CAS effectiveness, therefore, the AVG fell far short of the desired impact.

The third CAS criteria evaluates the AVG's integration of command relationships and planning. As already discussed, tactical level integration between the RAF, AVG, British Army, and Chinese Army never materialized. The theater commanders directly contributed to this failure. Their economy of force operation denied the British the opportunity to establish an overall commander for Burma until after the Japanese invasion.⁷¹ The Chinese Army ostensibly followed General Stilwell, but really reported directly to Generalissimo Chiang Kai-Shek.⁷² Furthermore, neither Stilwell nor Chiang trusted British commanders.⁷³ Similarly, Colonel Chennault directed the AVG independently despite being responsible to both the Generalissimo and Stilwell.⁷⁴ Air Vice Marshal Stevenson commanded the RAF in Burma, but was directed by his commander (RAF forces India) to establish his headquarters in Calcutta.⁷⁵ Thus, geographically separated air and ground staffs failed to communicate amidst the constant headquarters movement forced by

⁶⁹ Ford, *Flying Tigers*, 228.

⁷⁰ Ibid., 229.

⁷¹ Slim, *Defeat into Victory*, 10.

⁷² Stilwell, *The Stilwell Papers*, 50-54, 64.

⁷³ Ibid., 50.

⁷⁴ Chennault, *Way of a Fighter*, 154.

⁷⁵ Slim, *Defeat into Victory*, 8-9.

the Japanese offensive. Put simply, the air and ground command relationships functioned infrequently, and the planning staffs demonstrated no integration.

The fourth and final CAS evaluation criteria concerns the doctrine employed by the ground and air forces involved. Successful CAS requires a standardized system of planning and procedures by which the ground and air assets can coordinate their actions in the dynamic area of operations. Understanding the Allied CAS doctrine during the defense of Burma involves answering two questions. First, what CAS doctrine governed the US Army Air Corps at the beginning of WW II? Second, how did the AVG's doctrine differ from this baseline?

During the Interwar period, the Air Corps Tactical School debated the first question. Rapidly developing bomber technology, such as the XB-17, convinced the vast majority of US airpower thinkers pursuit aircraft could not successfully interrupt bombers flown in a mutually supportive formation, and spurred development of the daylight, high-altitude precision bombardment doctrine.⁷⁶ Thus, destroying the hostile air force through strategic bombing denied enemy air attacks on ground forces, and formed the centerpiece of "Air-Ground Cooperation."⁷⁷ The US Army Air Corps codified this doctrine in 15 April 1940 as Field Manual (FM) 1-5, "Employment of Aviation of the Army," less than one month before German operations rendered it obsolete. Designed as the central reference for all matters aviation, FM 1-5 relegated pursuit aircraft to anti-aircraft defenses, and subordinated them below anti-aircraft artillery.⁷⁸ In the section entitled "Air Operations in Support of Ground Forces," FM 1-5 confined ground attack to bombardment of the enemy's rear area beyond the range of ground weapons, and declared pursuit aircraft, "not suitable for the attack of surface objectives other than personnel or light

⁷⁶ Robert T. Finney, US Department of the Air Force, Air Force Historical Division, Research Studies Institute, *History of the Air Corps Tactical School: 1920-1940* (October 1955), 64-68.

⁷⁷ *Ibid.*, 72.

⁷⁸ Air Corps Field Manual (FM) 1-5, *Employment of Aviation of the Army* (Washington, DC: Government Printing Office, 15 April 1940), 15-17.

materials.”⁷⁹ To the Army Air Corps’ credit, FM 1-5 acknowledged the complicated nature of CAS operations, recommended close coordination by a combined commander, and required a well-defined plan built by both air and ground staffs.⁸⁰

Before the 1930s debate at the Air Corps Tactical resolved into the “bomber-always-gets-through” mentality, Major Claire Chennault provided the loudest dissenting voice.⁸¹ Since Chennault left the US Army Air Corps in 1937 to restructure the Chinese Air Force and found the AVG, his doctrinal thoughts heavily influenced the AVG’s employment in Burma.⁸² Chennault’s theory, expressed in *The Role of Defensive Pursuit*, argued pursuit aircraft could consistently intercept bombers if aided by a detection network and equipped with .50 caliber cannons.⁸³ He supported this theory with a series of exercises at Fort Knox between 1933-1936, and later proved them in combat in China.⁸⁴ As a result, the AVG’s doctrine differed from FM 1-5 in so far as pursuit aircraft became the primary anti-aircraft defense in Burma. On the other hand, Chennault never intended the AVG to serve as a dedicated ground-cooperation force. Thus, both the AVG and the larger US Army Air Corps entered combat without the necessary CAS doctrine, procedures, or command principles needed to accomplish CAS in Burma.

In summary, the AVG failed all four CAS evaluation criteria in Burma: the lack of air-ground communications prevented CAS responsiveness; minimal impact on enemy ground forces and fratricide destroyed CAS effectiveness; differing agendas and personality conflicts from the strategic to the tactical level impeded CAS integration; and, finally, insufficient CAS doctrine

⁷⁹ FM 1-5 (15 April 1940), 22, 42.

⁸⁰ Ibid., 22-23.

⁸¹ Finney, *History of the Air Corps Tactical School*, 76-78.

⁸² Chennault, *Way of a Fighter*, 31.

⁸³ Claire L. Chennault (Captain), US War Department, Army Air Forces School of Applied Tactics, *The Role of Defensive Pursuit* (1935), 11, 14.

⁸⁴ Chennault, *Way of a Fighter*, 21-23, 83-84, 129-130.

ignored both the potential of pursuit aircraft to impact the ground fight and the procedures necessary to actually execute CAS missions. These deficiencies, however, did not go unnoticed.

When Generalissimo Chiang Kai-Shek sent an urgent request for the AVG to provide CAS to Chinese forces in mid-April 1942, Chennault documented the problems preventing effective CAS in Burma. “Without excellent air-to-ground communications, trained air-liaison officers with ground troops, and a constant flow of reliable intelligence on the ground situation, close air support for ground troops is impractical.”⁸⁵ In addition to Chennault’s list, Field Marshal Slim added the insufficient number of Allied aircraft.⁸⁶ As a result, five key challenges faced Allied CAS planners after the fall of Burma: 1) confusing command relationships, 2) organizational stovepipes, 3) insufficient aircraft, 4) technological limitations, and 5) doctrinal deficiencies. Fortunately, Chennault leveraged contacts within the US Army Air Force and in Washington, D.C. to spread both the AVG’s highly successful air superiority tactics and their ground-cooperation shortfalls.⁸⁷ As Burma fell to the Japanese, therefore, the US Army Air Force initiated a comprehensive examination of aviation in support of ground forces.

Section 2: A CAS Phoenix Rises in Burma

April 1942 witnessed the Japanese Fifteenth Army’s crushing defeat of Allied forces in Burma, and the birth of modern CAS doctrine. Less than two years after fleeing into the Burmese jungle on their way to India, however, the Allies returned to Burma, defeated a Japanese invasion of India, and opened a critical supply route to China. A key ingredient in this remarkable reversal included a fresh approach to CAS implemented by the newly established Eastern Air Command. This case study examines changes in the strategic context between April 1942 and December 1943, recounts the Allied counterattack into Burma, evaluates the Allied campaign from

⁸⁵ Chennault, *Way of a Fighter*, 154.

⁸⁶ Slim, *Defeat into Victory*, 5, 42.

⁸⁷ Chennault, *Way of a Fighter*, 114, 154.

December 1943 to August 1944 using the same four CAS criteria defined in the previous section, and explores how Eastern Air Command addressed the AVG's five key CAS challenges.

Defeat in Burma produced significant strategic level changes, and dramatically reshaped Allied forces in the CBI Theater. First, the Combined Chiefs designated British Admiral Mountbatten as commander of the new South East Asia Command (SEAC). While Burma remained at the bottom of the Allied priority list in 1942-1943, the recognition of a theater commander increased troop morale, and reduced the confiscation of resources by other commanders along the twelve thousand mile supply route.⁸⁸ For example, the US Army Air Force organized, trained, and moved the 10th Air Force to India even before Burma fell in 1942.⁸⁹ While too late to save Burma, the mere arrival of new forces breathed life into SEAC units, and began the consolidation of the "Confused Beyond Imagination" theater.⁹⁰

Second, SEAC's creation elevated planning discussions about Burma to the highest levels of command. The minutes from the Casablanca Conference in January 1943 clearly established Allied intent to: 1) conduct limited operations to improve communications from India to China, 2) reestablish communications along a Burma road by the end of the year, 3) to keep China in the war, and 4) to reinforce the area with 500 aircraft.⁹¹

In August 1943, the TRIDENT AND QUADRANT Conferences in Quebec refined SEAC's objectives into:

1. to carry out operations for the capture of Upper Burma in order to improve the air route and establish overland communications with China. Target date: mid-February, 1944.

⁸⁸ Slim, *Defeat into Victory*, 191-192.

⁸⁹ Assistant Chief of Air Staff, Intelligence, Historical Division, US War Department, Army Air Forces Historical Studies, *No. 12: The Tenth Air Force, 1942*, (4 August 1944), 11.

⁹⁰ P. L. Freeman, US Department of the Air Force, Air Force Historical Research Agency, *Interview* (16 May 1975), 117.

⁹¹ US Department of the Air Force, Air Force Historical Research Agency, *CASABLANCA Minutes* (January 1943), enclosure B, 7.

2. to continue to build up and increase the air routes and air supplies of China, and the development of air facilities with a view to:
 - a. Keeping China in the war.
 - b. Intensifying operations against the Japanese.
 - c. Maintaining increased U.S. and Chinese Air Forces in China.
 - d. Equipping Chinese ground forces.⁹²

The final adjustment took place at the Cairo Conference in November 1943. In exchange for Soviet promises to attack Japan after defeating Germany, President Roosevelt and Prime Minister Churchill agreed to shift resources for an amphibious operation in Burma back to Europe.⁹³ Ultimately, this decision caused Generalissimo Chiang Kai-Shek to withhold eleven Chinese divisions in Yunnan.⁹⁴ Together, these three strategic conferences provided the unified vision and scope for operations in Burma largely missing from the chaotic defensive efforts of early 1942.

Admiral Mountbatten wasted no time in translating these directives into significant operational changes within his command. One of his first actions consolidated his air and ground staffs into a combined headquarters.⁹⁵ Next, Mountbatten integrated RAF and USAAF elements into Eastern Air Command.⁹⁶ The new command consisted of a subordinate Strategic Air Force (targeting Japanese Logistics) and the Third Tactical Air Forces (designed to support the upcoming ground campaigns).⁹⁷ By December 1943, the Eastern Air Command consisted of 576 aircraft with a good mix of heavy bombers, medium bombers, reconnaissance, transport, and pursuit aircraft.⁹⁸ As a result, the upcoming Burma offensive represented the Allies' first truly cohesive air-ground effort in the theater.

⁹² Romanus, *Stilwell's Command Problems*, 9.

⁹³ Slim, *Defeat into Victory*, 213.

⁹⁴ Ibid.

⁹⁵ Ibid., 199.

⁹⁶ Romanus, *Stilwell's Command Problems*, 84.

⁹⁷ Ibid.

⁹⁸ Ibid.

In November 1943, the Allied forces stood ready to reenter Burma. Careful training and reorganization of Chinese, British, and American forces forged a powerful force out of reinforcements and the remnants of the elements defeated by the Japanese in 1942. In addition to the new Eastern Air Command, Admiral Mountbatten controlled an offensive force of six British divisions and two Chinese divisions.⁹⁹ The final campaign plan envisioned a three-pronged attack into Burma. General Stilwell would command the X-Force (two Chinese divisions) attack to seize northern Burma, and reconstitute the Ledo Road into China. General Slim would oversee the Fourteenth Army attacks into both central Burma near Indaw (IV Corps) and the Arakan coast (XV Corps) near Akyab.¹⁰⁰

Only Generalissimo Chiang Kai-Shek's hesitation delayed the offensive. After the fall of Burma, China depended on the fragile airlift over the Himalayas to resupply its armies. He was concerned a Burma offensive would reduce the airlift, and restrict the critical flow of supplies to Chinese forces. Unwilling to jeopardize China's survival, the Generalissimo demanded naval and air domination before approving the Burma ground offensive.¹⁰¹ After multiple visits between Admiral Mountbatten, Generalissimo Chiang Kai-Shek, and General Stilwell, Generalissimo Chiang Kai-Shek approved the proposed operations on 19 December 1943, and placed General Stilwell in full command of the Chinese forces operating from India.¹⁰²

Meanwhile, Japanese forces in Burma made their own plans. Hoping to seize potential resources, break England's hostile intent, and add an independent India to the Axis powers, the Japanese slowly began reinforcing their Japanese occupation forces in Burma for an attack.¹⁰³

⁹⁹ Romanus, *Stilwell's Command Problems*, 120.

¹⁰⁰ Slim, *Defeat into Victory*, 198.

¹⁰¹ Stilwell, *The Stilwell Papers*, 167.

¹⁰² *Ibid.*, 266.

¹⁰³ Fuwa (Colonel), US Department of the Army, Office of the Chief of Military History, US Army Far East Command, 1st Demobilization Bureau, *Japanese Monograph No. 58, The Record of Burma Operations: Part II* (August 1946), 13.

Beginning in November 1943, the four divisions of the Fifteenth Army received three more ground divisions and the dedicated support of the 5th Air Division.¹⁰⁴ Allied intelligence indicated Japanese commanders arrayed their forces throughout western, central, and southern Burma to prevent an amphibious landing from India, secure key port infrastructure, and maintain land lines of communication with their forces in Thailand.¹⁰⁵

In actuality, Japanese forces in Burma possessed eight ground divisions plus some key enablers.¹⁰⁶ While they anticipated operations in the Arakan peninsula and near Ledo, Japanese leaders considered amphibious operations unlikely.¹⁰⁷ Accordingly, the Japanese established the Burma Area Army, and made plans to create operational army headquarters in the three different regions of Burma.¹⁰⁸ Fortunately for the Allies, the Twenty-Eighth Army and Thirty-Third Army headquarters did not arrive in Burma until 5 January 1944.¹⁰⁹ Furthermore, maintaining the 5th Air Division's strength proved impossible due to growing defensive demands in China, the Philippines, and the Japanese homeland.¹¹⁰ As a result, the Burma Area Army and the Fifteenth Army experienced tremendous difficulty controlling the defensive operations of their geographically isolated forces.

On 20 December 1943, General Stilwell led the X-Force into northern Burma (see Figure 2 next page).¹¹¹ Working with the American Northern Air Sector Force's dedicated support (a

¹⁰⁴ Slim, *Defeat into Victory*, 231-232.

¹⁰⁵ Romanus, *Stilwell's Command Problems*, 42.

¹⁰⁶ Fuwa, *Japanese Monograph No. 58*, 4, 10.

¹⁰⁷ *Ibid.*, 2.

¹⁰⁸ *Ibid.*, 8 & 19.

¹⁰⁹ *Ibid.*

¹¹⁰ Tadao Sakai (Lt. Colonel) and Eiji Yamaguchi (Lt. Colonel), Office of the Chief of Military History, US Army Far East Command, 1st Demobilization Bureau, *Japanese Monograph No. 59, Burma Operation Record (Third Period)* (August 1946), 2.

¹¹¹ Stilwell, *The Stilwell Papers*, 267.

and defeat the Japanese.¹¹⁴ The Japanese 5th Air Division's staff officers latter reported the Eastern Air Command frustrated Japanese efforts to establish air superiority, disrupted Japanese ground attacks, and rendered bombing efforts ineffective.¹¹⁵ As this was the first time a British force defeated a major Japanese attack, Field-Marshal Viscount Slim described this operation as the turning point in the Burma Theater.¹¹⁶

Despite initial victories, the Allies still faced tough resistance in Burma. On 8 March 1944, the Japanese launched a three-division counterattack into the British IV Corps near Imphal.¹¹⁷ This attack cut off a British division, besieged Kohima, and threatened to sever General Stilwell's line of communications to India.¹¹⁸ In a meeting on 3 April 1944, General Slim directed General Stilwell to keep the newly arriving Chinese reinforcements, and make an attack toward Myitkyina.¹¹⁹ This bold plan aimed at driving the Japanese from northern Burma, but required a significant diversion of airlift from China to the beleaguered British units in the Imphal.

Launching a surprise raid on Myitkyina the morning of 16 May 1944, General Stilwell's forces took the airfield, and scattered local Japanese resistance.¹²⁰ Unfortunately, Chinese reinforcements fired on each other, panicked, and withdrew.¹²¹ This delay allowed elements of

¹¹⁴ Slim, *Defeat into Victory*, 237-243.

¹¹⁵ Masa Tanaka (Lt. Colonel) & Susumu Ogata (Major), US Department of the Army, Office of the Chief of Military History, US Army Far East Command, 1st Demobilization Bureau, *Japanese Monograph No. 64, Burma Air Operations Record: Jan. 1942 – Aug. 1945* (October 1946), 65.

¹¹⁶ Slim, *Defeat into Victory*, 246.

¹¹⁷ Romanus, *Stilwell's Command Problems*, 174.

¹¹⁸ Slim, *Defeat into Victory*, 271.

¹¹⁹ *Ibid.*, 272-273.

¹²⁰ Stilwell, *The Stilwell Papers*, 296-297.

¹²¹ *Ibid.*, 297-298.

the Japanese 56th Division to establish strong defensive positions, and the resulting siege continued until the Japanese withdrawal on 4 August 1944¹²²

While Stilwell's forces wore down Japanese defenses in Myitkyina, the British IV Corps fought a desperate battle against the Japanese and against time in the center of the Allied line. Multiple isolated pockets at Kohima and Imphal held out despite being vastly outnumbered from 30 March until 22 June.¹²³ According to Field Marshal Viscount Slim's account, total air superiority, aerial resupply, air evacuation, and ability to shift airstrikes enabled the IV Corps to halt the enemy attack, inflicted significant enemy casualties, and cast enemy supply efforts into confusion.¹²⁴ When they broke out of their defensive positions, the British Fourteenth Army inflicted a costly defeat upon Japan's Fifteenth Army, and seized central Burma as far south as Tamu by 6 August 1944.

In early August, therefore, Allies consolidated their forces on key terrain stretching from the Arakan coast across the Imphal valley to Myitkyina and the Chinese border. In fact, the capture of Myitkyina airfield allowed a lower altitude airlift route to China, and boosted average monthly delivery from eleven thousand tons to over thirty thousand tons.¹²⁵ On the Japanese side, the loss of Myitkyina marginalized the remnants of the 5th Air Division, and virtually erased their battlefield impact.¹²⁶ Forced to acknowledge the defeats at Imphal and Myitkyina, the Burma Area Army retreated to southern Burma.¹²⁷ Throughout the campaign, the Allies inflicted more

¹²² Fugio Kawamichi (Colonel), US Department of the Army, Office of the Chief of Military History, US Army Far East Command, 1st Demobilization Bureau, *Japanese Monograph No. 61, Burma Operation Record (Third Period)* (August 1946), 5.

¹²³ Slim, *Defeat into Victory*, 301, 346.

¹²⁴ *Ibid.*, 306, 320, 332.

¹²⁵ Romanus, *Stilwell's Command Problems*, 112.

¹²⁶ Fugio Kawamichi (Colonel), US Department of the Army, Office of the Chief of Military History, US Army Far East Command, 1st Demobilization Bureau, *Japanese Monograph No. 62, Burma Operation Record (Third Period)* (October 1946), 44.

¹²⁷ Fuwa, *Japanese Monograph No. 58*, 50.

than fifty percent casualties on the Japanese 15th, 18th, 31st, and 33rd Divisions.¹²⁸ The monsoon months brought a relative lull in the fighting, and the Allies prepared for their final pushes into lower Burma. Fighting continued in Burma until the Japanese surrender in 1945, but the Japanese now fought to delay, instead of defeat, the eventual Allied victory.

Many historical reconstructions of the 1943-1944 Allied offensives in Burma focus on command relationships, ground force execution, and the role of aerial resupply. Surprisingly, the incredible air-ground integration enacted throughout this campaign received very little analysis. The Eastern Air Command demonstrated surprising agility in its support of ground operations in Burma. In fact, the United States Air Force Historical Division later declared, “the air support rendered by the 80th [Fighter Group, part of the Third Tactical Air Force’s American Northern Air Sector Force] to the American, Chinese, and British armies in this Burma campaign was, by the standards of effectiveness and efficiency, perhaps unequaled in any other theater of operations.”¹²⁹ To evaluate this conclusion, the following analysis investigates the Eastern Air Command’s CAS responsiveness, effectiveness, integration, and doctrine.

Previously, the AVG and RAF failed the CAS responsiveness test because they could not establish a reliable, two-way means of communication with each other or with ground forces. Eastern Air Command worked diligently to fix this problem between April 1942 and December 1943. Admiral Mountbatten took the first step when he collocated the air and ground headquarters.¹³⁰ This ensured rapid crosstalk between the major communication nodes at the operational level. At the tactical level, equipment and procedural innovation made the second step. While limited equipment and strict communications security plagued the AVG, the Eastern Air Command procured new radios, integrated RAF and AVG communications, and implemented a

¹²⁸ Slim, *Defeat into Victory*, 378. & Romanus, *Stilwell’s Command Problems*, 220.

¹²⁹ US Department of the Air Force, Air Force Historical Division, Research Studies Institute, *Brief History of 80TH Fighter Group: 1942-1945* (October 1956), 5.

¹³⁰ Slim, *Defeat into Victory*, 199.

new air-ground interface. The purchase and distribution of SCR-117 and SCR-118 radios bridged the technological gap between aircraft and ground radios.¹³¹ More importantly, the Third Tactical Air Force intentionally trained, equipped, and distributed “air party” teams of one to two officers and six to eight enlisted personnel with each brigade in Burma.¹³² These teams connected aircraft, air headquarters, ground headquarters, and tactical command posts so well that the entire system began reacting to CAS requests in less than twenty minutes.¹³³ Field Marshal Viscount Slim recounted these air party teams enabled “continuous cover and quick support at call” which prevented serious consequences on multiple occasions.¹³⁴ CAS units could hardly ask for higher praise from a ground commander. After the war, Lt Col. Masa Tanaka, a Japanese 5th Air Division staff officer, summarized the transformation from the enemy viewpoint:

There seemed to be no close coordination between the British and American air forces at the time of their retreat from Burma, However, becoming closely linked since the middle of 1943, they fused into one force at the end of the same year, and simultaneously with the improvements in the types of planes, the began to carry out offensive operations.¹³⁵

In some cases, the pilots engaged directly with ground commanders in pre-flight briefings, inflight activities, and post-flight evaluations. The 88th Fighter Squadron flew 1,958 sorties in support of General Stilwell’s ground forces from Myitkyina airfield during the siege months of May through August 1944 using its twelve P-40N aircraft (capable of carrying three 250 pound bombs).¹³⁶ In his report on their operations, Captain Allred identified three keys to their successful air-ground support: 1) complete air superiority, 2) ideal briefing and liaison, and 3)

¹³¹ Romanus, *Stilwell’s Command Problems*, 89.

¹³² Ibid.

¹³³ Ibid.

¹³⁴ Slim, *Defeat into Victory*, 303.

¹³⁵ Tanaka, *Japanese Monograph No. 64*, 6.

¹³⁶ *Brief History of 80TH Fighter Group*, 12.

locally developed bombing techniques.¹³⁷ The direct communication allowed the 88th Fighter Squadron to fulfill CAS requests in as little as ten minutes.¹³⁸ This remains impressive even by modern standards. The Eastern Air Command provided highly responsive CAS in Burma.

CAS effectiveness differs from CAS responsiveness by examining the tangible impact of the CAS missions on the battlefield. Just as in the AVG analysis, this section evaluates CAS effectiveness by documenting enemy targeting, enemy tempo, and friendly freedom of maneuver. Enemy targeting largely failed during this campaign. Staff officers from the Japanese 5th Air Division testified the increase of Allied airpower rendered daylight bombing operations nearly impossible, and night-time efforts ineffective.¹³⁹ When combined with Japanese choices to prioritize the defense of the Philippines, the losses experienced by the Japanese air effort over Imphal effectively decimated the remaining enemy air power in Burma.¹⁴⁰ Despite their last ditch efforts, a quote from Field Marshal Viscount Slim's account summarized their effect, "The enemy's inactivity in the air at this critical time is a measure of what the 17th Division owed to 221 Group R.A.F."¹⁴¹

Allied CAS also significantly impacted enemy ground forces. General Stilwell's diary recorded one of his subordinate's request, "Do not need battalion, want air to keep artillery down."¹⁴² These ground commanders understood, and relied upon, the power of CAS to suppress enemy firepower. Members of the Japanese Burma Area Army staff acknowledged the impact of CAS in their analysis of their operations at Imphal. They concluded their operations were,

¹³⁷ Allred, *Dive Bombing Tactics*, 5.

¹³⁸ *Brief History of 80TH Fighter Group*, 11.

¹³⁹ Tanaka, *Japanese Monograph No. 64*, 39.

¹⁴⁰ *Ibid.*, 67.

¹⁴¹ Slim, *Defeat into Victory*, 303.

¹⁴² Stilwell, *The Stilwell Papers*, 282.

“checked by stubborn enemy counterattacks from air and land.”¹⁴³ In contrast to the accounts of Japanese air and ground attacks in 1942, these accounts reveal a CAS system highly effective at disrupting enemy targeting.

The second measure of CAS effectiveness addresses the disruption of enemy tempo. Before examining the data, the reader must remember the Japanese forces in Burma represented some of the most elite units in the Imperial Army. Flushed from their victories in Singapore, Malaya, and Burma, the Fifteenth Army contained devoted, unusually skilled, and highly experienced practitioners of jungle warfare.¹⁴⁴ Despite the quality of frontline troops, Chinese and British leaders observed the Japanese units operated on a “very small administrative margin of safety.”¹⁴⁵ This meant attacking Japanese forces risked culmination unless they captured enemy supplies within nine days of launching their attack. In 1942, the overwhelming onslaught of Japanese air and ground attacks allowed them to capture both British and Chinese supplies. This prolonged their operations, and resulted in the capture of Burma.

The 1943-1944 campaign showcased very different results. During all three Japanese counterattacks (Arakan, Imphal, and Walabum), a combination of ground troop tenacity, aerial resupply, air superiority, and CAS firepower prevented the loss of the administrative areas containing key supplies.¹⁴⁶ Thus, when Japanese troops consumed the one-week supply of food and ammunition they hand-carried into combat, the Japanese divisions struggled to move the remaining two-week supply cache forward.¹⁴⁷ When the British continued to hold, a dramatic reversal occurred, and Japanese penetrations along the Imphal front became Allied encirclements

¹⁴³ Tanaka, *Japanese Monograph No. 64*, 34.

¹⁴⁴ Slim, *Defeat into Victory*, 231-232.

¹⁴⁵ *Ibid.*, 18.

¹⁴⁶ *Ibid.*, 241.

¹⁴⁷ Fuwa, *Japanese Monograph No. 58*, 37.

as CAS interrupted Japanese resupply attempts.¹⁴⁸ Col Fujiwara, the G-2/3 of the Fifteenth Army, confirmed this after the war in his statement:

With a good signals system and air supplies, the Allies were able to carry out their operations freely and unhindered whereas the Japanese without air supplies and with their only means of supply – ground transport – cut off, were in a paralyzed state...The difference in air-ground cooperation between the Japanese Army and the Allies was the difference between victory and defeat.¹⁴⁹

Strung out, confined to nighttime movement, and literally starving from May 1944 on, the Fifteenth Army suffered the results of a highly effective CAS attack on their tempo.

The third aspect of CAS effectiveness included in this analysis measures the CAS effect on friendly freedom of maneuver. The interval between April 1942 and December 1943 allowed the Allies to reconstitute an offensive force for operations in Burma. On the other hand, the same interval gave the Japanese the opportunity to construct a formidable defense throughout the country. One particular example of this included the area surrounding Myitkyina airfield. As the major airfield in northern Burma, the Japanese committed the 18th and 56th Divisions to its defense.¹⁵⁰ CAS support of Wingate's airborne force enabled them to cut the 18th Division's supply line, allowed General Stilwell's ground forces to surround it, and set conditions for a daring leap forward.¹⁵¹ When Merrill's Marauders executed their surprise attack on 16 May 1944, they seized the Myitkyina airfield, but could not drive the Japanese defenders from their nearby defensive perimeter.¹⁵²

In response to this stalemate, the Eastern Air Command dispatched the 88th Fighter Squadron to Myitkyina. Due to the extremely restrictive jungle terrain throughout Burma, Task

¹⁴⁸ Fuwa, *Japanese Monograph No. 58*, 42.

¹⁴⁹ Romanus, *Stilwell's Command Problems*, 90.

¹⁵⁰ Fuwa, *Japanese Monograph No. 58*, 19.

¹⁵¹ *Ibid.*, 47-48.

¹⁵² Stilwell, *The Stilwell Papers*, 295-298.

Force Myitkyina commanders began to view CAS aircraft as replacements for artillery.¹⁵³ The 88th Fighter Squadron alone dropped twenty percent more tonnage in bombs than was fired by artillery.¹⁵⁴ Accuracy, however, always trumps tonnage.

Fortunately, the air-ground team at Myitkyina pioneered three critical procedures, and utilized them to produce an astounding ninety percent target destruction rate.¹⁵⁵ First, the ground commanders described the location of camouflaged strongpoints to pilots using detailed reconnaissance imagery.¹⁵⁶ This allowed pilots to accurately strike concealed positions using familiar ground references. Second, Captain Allred created low-altitude, slow speed, dive-bombing techniques, and drilled them into his pilots.¹⁵⁷ These techniques routinely allowed pilots to drop their standard 250-pound bombs on enemy targets within twenty-five yards of friendly troops.¹⁵⁸ Third, the 88th Fighter Squadron employed different munitions to achieve varying effects on the enemy. For example, firebombs improvised from fuel tanks allowed them to attack personnel concentrations, and five hundred pound bombs with delayed fuses disrupted nighttime movement along lines of supply.¹⁵⁹ Brig. General T. F. Wessels, commander of Task Force Myitkyina, lauded the casualty-reducing, mobility-enhancing cooperation between the 88th Fighter Squadron and ground elements, and said, “I doubt if any more perfect co-ordination of ground and air attack can be found in this war.”¹⁶⁰

¹⁵³ T. F. Wessels (Brig. General), US War Department, Headquarters Myitkyina Task Force, *Commendation* (10 August 1944), 1.

¹⁵⁴ Romanus, *Stilwell's Command Problems*, 251.

¹⁵⁵ Allred, *Dive Bombing Tactics*, 7.

¹⁵⁶ *Ibid.*, 6.

¹⁵⁷ *Ibid.*, 7-9.

¹⁵⁸ Wessels, *Commendation*, 1.

¹⁵⁹ Allred, *Dive Bombing Tactics*, 10.

¹⁶⁰ Wessels, *Commendation*, 1.

From supporting airborne troops to cutting-edge tactical CAS procedures, Eastern Air Command empowered General Stilwell's ground forces' freedom of maneuver. As the full weight of coordinated CAS fell upon the Japanese, friendly forces exploited the psychological benefits. As each pilot finished his last attack, they rocked their wings as a visual signal to ground forces. Then, the pilot would make multiple dive passes over the enemy simulating further air attacks. This forced the enemy into hiding, and aided the initial ground assaults.¹⁶¹ Furthermore, these procedures built trust between air and ground forces. In almost two thousand sorties operating with as little as ten yards separation from friendly forces, the 88th Fighter Squadron avoided any incidents of fratricide.¹⁶² For effectively ending Japanese air attacks, suppressing Japanese artillery, interdicting Japanese supply, and enabling friendly freedom of maneuver, the Eastern Air Command achieved high marks for CAS effectiveness.

CAS integration assesses the degree of connectivity between air and ground commanders and staffs. Admiral Mountbatten's decision to collocate Eastern Air Command's headquarters in Comilla with the Fourteenth Army headquarters built a sense of brotherhood among the commanders and staffs.¹⁶³ Also, it enabled a joint planning process in which course of action development for both air and ground forces proceeded concurrently, and required air support agreements before any plan finalized.¹⁶⁴ General Stilwell's diary entries from 18-20 October 1943 reveal an inside glimpse into very closely linked air and ground planning, even if it wasn't always friendly.¹⁶⁵ The presence of air parties throughout the command hierarchy assisted in maintaining this excellent CAS integration from the SEAC/Eastern Air Command/Eleventh Army Group

¹⁶¹ Allred, *Dive Bombing Tactics*, 6.

¹⁶² *Ibid.*, 7.

¹⁶³ Slim, *Defeat into Victory*, 212.

¹⁶⁴ *Ibid.*, 209-211.

¹⁶⁵ Stilwell, *The Stilwell Papers*, 163-164.

headquarters to the 10th Air Force/X-Force/Fourteenth Army headquarters to the 88th Fighter Squadron/Task Force Myitkyina headquarters.

In terms of CAS responsiveness, CAS effectiveness, and CAS integration, the Eastern Air Command performed far better than the AVG and RAF forces in Burma during 1942. The root cause behind the dramatic turn-around rested in the fourth evaluation criteria: CAS doctrine. By 1942, Allied experiences, like the AVG's in Burma, against both German and Japanese forms of air-ground warfare highlighted FM 1-5's lack of a cohesive air-ground cooperation doctrine, and led to an intensive investigation.¹⁶⁶ In March 1942, the Army Air Force Director of Military Requirements office established a ground support directorate to create a new CAS doctrine.¹⁶⁷ Field forces did not have to wait very long.

On 9 April 1942, General George C. Marshall signed FM 31-35, "Aviation in Support of Ground Forces." The unremarkable title belies the importance of this field manual to the future of CAS in the United States military. FM 31-35 included three elements that established the foundation of the CAS structure employed by Eastern Air Command in Burma during the 1943-1944 campaign. First, FM 31-35 established a new organization of forces. The Air Support Command represented the first aviation organization dedicated purely to the support of ground forces, contained organic reconnaissance aircraft, and could expand to control other aircraft based on the situation.¹⁶⁸ Second, FM 31-35 defined the nature, role, training, and criticality of the air party system. Within each Air Support Command, FM 31-35 made the Air Support Control headquarters the central location for commanding aviation assets, allocated trained officers as liaisons to supported units, outlined equipment requirements for lower-level integration, and

¹⁶⁶ Assistant Chief of Air Staff, Intelligence, Historical Division, US War Department, *Army Air Forces Historical Studies, No. 13: The Development of Tactical Doctrines at AAFSAT & AAFTAC* (July 1944), 9.

¹⁶⁷ Ibid.

¹⁶⁸ Basic Field Manual (FM) 31-35, *Aviation in Support of Ground Forces* (Washington, DC: Government Printing Office, 9 April 1942), 1.

mandated collocation with the primary ground force headquarters.¹⁶⁹ Third, FM 31-35 acknowledged the tension between centrally controlled air assets and the demands of ground forces, and outlined four important procedures by which to establish air-ground teamwork. These procedures included: specified mission types with critical requirements, fratricide prevention techniques, radio net structures, and standardized air support requests.¹⁷⁰ Together with emerging technology, FM 31-35 ushered the US Army Air Force into the modern CAS era.

Innovation, however, did not end with FM 31-35. Released the next day, FM 1-15 expanded the missions of pursuit aircraft to include support of ground forces, and identified the need for aviation commanders to understand the ground force plan of operations.¹⁷¹ On 18 January 1943, the War Department issued a new FM 1-5 incorporating most of the 1942 FM 31-35, and expanding a few key sections. In an effort to separate strategic air employment from air-ground cooperation, the Air Support Command expanded to include reconnaissance, and dive bombardment aircraft organically, but bomber and fighter aircraft could only be assigned temporarily.¹⁷² The new FM 1-5 urged the creation of air warning services with radar, ground observers, and aircraft patrols.¹⁷³ Also, the new FM 1-5 created a unique channel for special requests for air support by ground commanders, and outlined ground alert procedures to answer these requests.¹⁷⁴ Finally, the USAAF published FM 100-20 on 21 July 1943 to reiterate a supreme commander's responsibility to set guidance over both air and ground assets, and to establish three enduring priorities for aviation assets supporting ground forces: 1) air superiority,

¹⁶⁹ FM 31-35, 2-5.

¹⁷⁰ Ibid., 11-12, 14-18, 45, 53.

¹⁷¹ Army Air Forces Field Manual (FM) 1-15, *Tactics and Technique of Air Fighting* (Washington, DC: Government Printing Office, 10 April 1942), 18, 38.

¹⁷² Army Air Forces Field Manual (FM) 1-5, *Employment of Aviation of the Army* (Washington, DC: Government Printing Office, 18 January 1943), 1, 39.

¹⁷³ Ibid., 33-35.

¹⁷⁴ Ibid., 42-44.

2) interdicting enemy forces and supplies, and 3) combined effort on the immediate front.¹⁷⁵ The release of FM 100-20 marked the final doctrinal change prior to the 1943-1944 Burma campaign.

The organization of Eastern Air Command paralleled doctrinal developments during the Allied preparations to retake Burma. From collocated headquarters to air party teams to the division of Eastern Air Command's assets, doctrine played a crucial role in the buildup, consolidation, and employment of airpower in Burma. While imperfect, the Eastern Air Command's employment of CAS doctrine represented a significant step forward.

In fact, the doctrinal changes paved the way for Eastern Air Command to address all five of the key CAS challenges identified by their AVG predecessors. While still subject to personality conflicts and national differences, planning conferences (i.e. Casablanca) and Admiral Mountbatten's SEAC structure clarified the tangled mess of command relationships in Burma. Next, the consolidation of planning staffs at Comilla began the process of breaking organizational stovepipes between air and land forces.¹⁷⁶ The development and utilization of the air party system continued this process down to the lowest levels of tactical command. Meanwhile, rising US industrial capacity steadily increased both the quality and quantity of aircraft available in the CBI Theater. The new aircraft simultaneously resolved the AVG's mass problem, and provided CAS-enabling technological capabilities like radios, bomb racks on pursuit aircraft, and high-fidelity reconnaissance photography. Using the US Army Air Force's new CAS doctrine, this well led, freshly equipped, multinational, air-land team effectively addressed all five key CAS challenges as it overwhelmed the Japanese forces defending Burma.

In summary, the Eastern Air Command both satisfied all four CAS evaluation criteria and overcame all five key CAS challenges in the 1943-1944 Burma campaign. Their actions demonstrated a robust CAS capability to respond to the needs of the ground force it supported.

¹⁷⁵ Field Service Regulations Field Manual (FM) 100-20, *Command and Employment of Air Power* (Washington, DC: Government Printing Office, 21 July 1943), 1-2, 10-11.

¹⁷⁶ Slim, *Defeat into Victory*, 199.

They showed great effectiveness by interrupting enemy targeting, slowing enemy tempo, and ensuring friendly freedom of maneuver. The Eastern Air Command integrated CAS command and planning at every headquarters level. Lastly, their robust doctrinal framework enabled EAC to achieve decisive CAS effects. The EAC met the needs of their supported ground commanders, and earned a place of honor in the history of CAS development.

Section 3: The Roots of Modern CAS

The AVG and EAC case studies reveal a dramatic increase in the Allies' understanding and application of CAS between December 1941 and August 1944. More than simply a local success, however, the use of airpower in the CBI Theater set the standard for future CAS employment, and this standard still operates today. The differences between German and Allied CAS models, contrasts between the Burma and North Africa campaigns, and continuities between CAS doctrines in Burma and modern CAS conflicts support this argument. While both a complete evaluation of German CAS doctrine and a thorough description of CAS in North Africa exceed the scope of this analysis, some summary points highlight the core issues.

The German Luftwaffe entered World War II far better prepared to execute CAS than any other air force. In his seminal work *The Luftwaffe*, James Corum documents the rapid development, testing, and refinement of the Luftwaffe's approach to CAS. The need to create air superiority over the decisive battle in order to bring combined air and ground fires to bear on the enemy guided the Luftwaffe's doctrine, procurement, and organization.¹⁷⁷ From the outset, the general staff's fighter inspectorate expected to use fighter aircraft in low-level attacks against enemy forces after they established air superiority.¹⁷⁸ Accordingly, Luftwaffe leadership developed liaison units from the army to division level, mandated joint exercises, and shaped development of both reconnaissance and dive-bombing aircraft to meet army support

¹⁷⁷ James S. Corum, *The Luftwaffe: Creating the Operational Air War, 1918-1940* (Lawrence, KS: University Press of Kansas, 1997), 146.

¹⁷⁸ *Ibid.*, 244.

requirements.¹⁷⁹ When the Spanish Civil War confirmed the impact of CAS, the Luftwaffe combined more than three hundred aircraft into the CAS-specialized force named the *Nahkampfdivision*.¹⁸⁰ This unit paid dividends in both the Polish and French campaigns.

Despite their significant achievements in the Interwar period, the Luftwaffe ultimately failed to provide the CAS required to defeat Allied forces for two reasons. First, the Luftwaffe viewed strategic bombing, air transport, and aerial resupply as separate missions, and did not effectively integrate them into the CAS process.¹⁸¹ Second, Germany failed to resource the Luftwaffe for the attrition-style air war after the 1940 campaign.¹⁸² Together, these factors created a downward spiral that decimated the Luftwaffe. Without the Luftwaffe, the Wehrmacht could not fight the war of maneuver envisioned by German leaders.

In contrast, Admiral Mountbatten ensured Eastern Air Command leaders carefully integrated different air power missions and resupply into the CAS framework. Air transport and aerial supply enabled the British defense of Imphal in the face of a fierce Japanese counterattack.¹⁸³ Strategic bombing from Indian bases interdicted Japanese supplies by targeting shipping and rail communications.¹⁸⁴ Furthermore, Admiral Mountbatten oversaw the reinforcement of US Army Air Force personnel (105,071 in January 1944 to 186,364 in August 1944) while opening the critical port of Bombay to Allied shipping.¹⁸⁵ As a result, Eastern Air Command provided increasing levels of tactical support and supply to the ground forces in Burma.

¹⁷⁹ Corum, *The Luftwaffe*, 245-247.

¹⁸⁰ *Ibid.*, 245, 248.

¹⁸¹ *Ibid.*, 284-286.

¹⁸² *Ibid.*

¹⁸³ Slim, *Defeat into Victory*, 291.

¹⁸⁴ Romanus, *Stilwell's Command Problems*, 91-92.

¹⁸⁵ *Ibid.*, 258, 264.

Another key comparison contrasts the use of air power in the North African and CBI Theaters. Brig. General Monro MacCloskey's account of the 12th Air Force's campaign in North Africa illustrates several of these differences. First, the air priorities in North Africa, particularly early in the campaigns, emphasized interdiction over CAS.¹⁸⁶ The scope of the campaign and the limited amount of air assets magnified this problem.¹⁸⁷ Second, the North African campaigns suffered from intense debates over command of air assets. As the first significant employment of US ground personnel, air-land cooperation suffered from individuals on both sides who attempted to redirect the focus of the air campaign as operation progressed. Proponents of centralized command and control of air units focused on the air superiority battle, while ground commanders sought dedicated CAS for ground units.¹⁸⁸ These issues led Brig. General MacCloskey to conclude at the end of the North African campaigns, "The endless conflict could not be resolved except by a more comprehensive approach to tactics than either ground or air officers were in the habit of employing. It remained to be worked out in subsequent months when Allied air resources were more plentiful."¹⁸⁹

In comparison to the constant bickering in North Africa, bitter memories of 1942's defeat shaped the 1943-1944 Burma campaign, and very clearly established the need for CAS via complete air-ground integration. Working on the basis of FM 100-20, Eastern Air Command simultaneously dispatched individual units, like the 88th Fighter Squadron, in response to ground commander requests to support ground forces in specific battles, and maintained operational level control of air assets in order to rapidly adjust to the changing tactical realities in Burma.¹⁹⁰ This

¹⁸⁶ Monro MacCloskey, *Torch and the Twelfth Air Force* (New York: Richards Rosen Press, 1971), 177.

¹⁸⁷ Ibid.

¹⁸⁸ Ibid.

¹⁸⁹ Ibid.

¹⁹⁰ Stilwell, *The Stilwell Papers*, 273.

intense cooperation enabled Eastern Air Command to dedicate one third of all sorties to CAS during the critical months of May-June 1944, while maintaining air superiority, airlifting supplies to China, and interdicting Japanese resupply operations.¹⁹¹ Overall, the way SEAC depended on, exploited, and controlled air power in Burma shares much more in common with modern operations than with the North African campaigns.

As the current governing document for the US Joint CAS employment, JP 3-09.3 showcases the influence of the 1943-1944 Burma campaign on modern CAS. The JP 3-09.3 specifies the following conditions for effective CAS: 1) trained, skilled personnel; 2) effective planning and integration; 3) clear command and control; 4) air superiority; 5) target identification; 6) standardized procedures; 7) careful alignment of ordinance and intended effects; and 8) conducive weather conditions.¹⁹² This list contains the missing elements Chennault identified in his report, matches the system outlined in FM 31-35 (9 April 1942), and mirrors the procedures established within Eastern Air Command.¹⁹³ Next, the JP 3-09.3 emphasizes the importance of fratricide mitigation through planning, liaison elements, tracking forward ground elements, and clearance of fires.¹⁹⁴ As discussed in the summary of the siege of Myitkyina, the Eastern Air Command innovated several of these methods. In particular, the forces at Myitkyina pioneered a grid-based air-ground deconfliction and targeting system when they used reconnaissance photos to redirect airborne aircraft toward developing targets.¹⁹⁵ The Military Grid Reference System continues this legacy.¹⁹⁶ Another striking comparison rests in the air-

¹⁹¹ Romanus, *Stilwell's Command Problems*, 90.

¹⁹² JP 3-09.3, x.

¹⁹³ Chennault, *Way of a Fighter*, 154; FM 31-35, 5-6; & Romanus, *Stilwell's Command Problems*, 88-90.

¹⁹⁴ JP 3-09.3, x.

¹⁹⁵ Allred, *Dive Bombing Tactics*, 6.

¹⁹⁶ JP 3-09.3, V-6.

ground communication network. Figures 3 and 4 (see next page) show the communication networks recommended by FM 31-35 (9 April 1942) and JP 3-09.3 (8 July 2009) respectively.

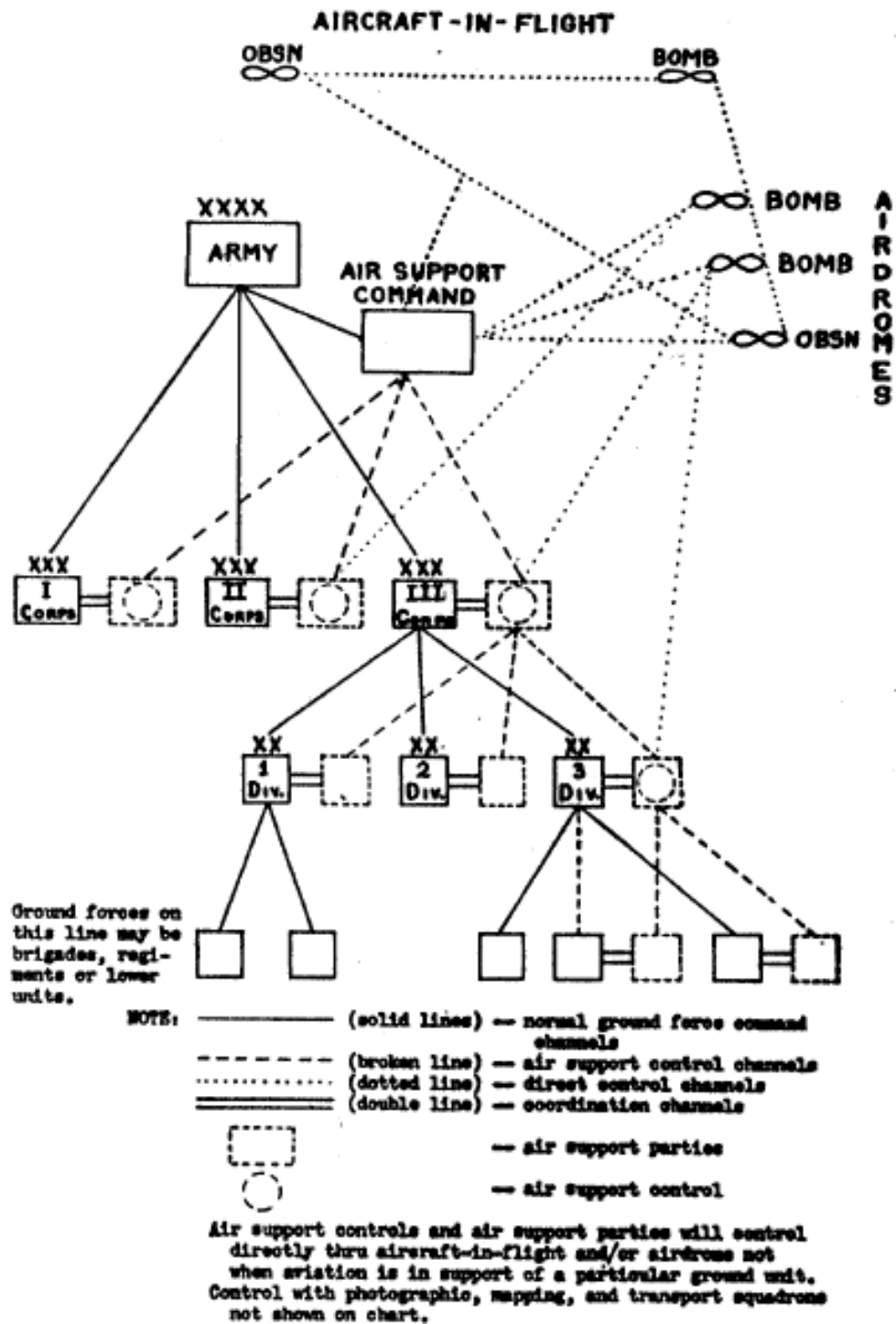


Figure 3: Air Support Command Tactical Control of Combat Aviation

Source: FM 31-35, 4.

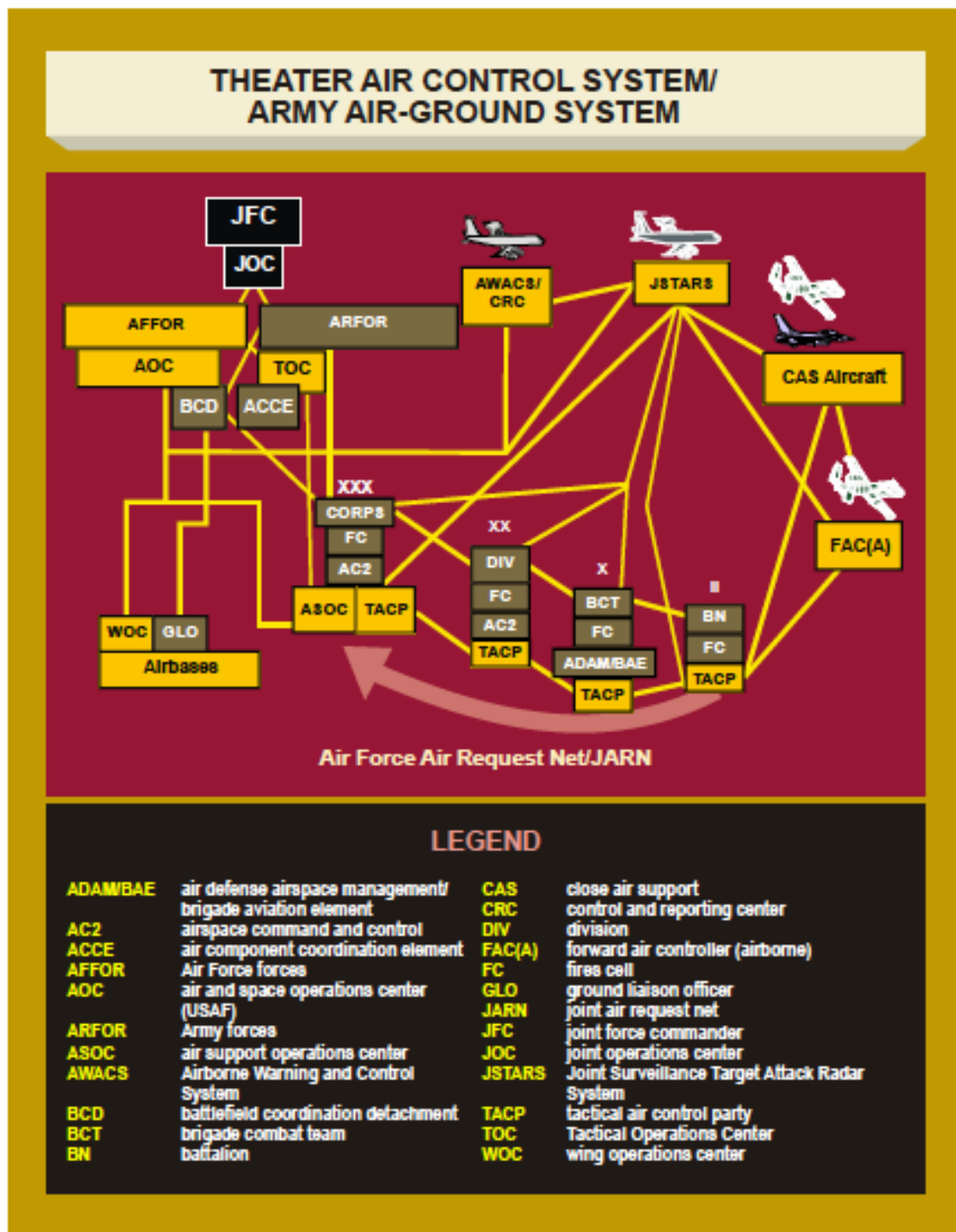


Figure 4: Theater Air Control System/Army Air-Ground System

Source: JP 3-09.3, II-5.

Despite more than sixty years since, the creation of the US Air Force, and unprecedented change in technology, the network only changed in two ways. The JP 3-09.3 version (Figure 4)

incorporates ground liaisons sent to Air Force headquarters and airborne command and control platforms. Apart from these minor changes, a modern reader could quickly construct the modern TACS/AAGS system based on their knowledge of US Army organization levels, modern aircraft, and the FM 31-35 outline (Figure 3).

Developed differently than German CAS and controlled in a different way than the North African campaigns, Eastern Air Command's implementation of FM 31-35 in Burma established a new pattern. This pattern included a set of clear CAS requirements, standardized procedures designed to protect friendly forces while concentrating fire on the enemy, and an agile means of adjusting force application through robust communication channels. JP 3-09.3 shows this pattern still governs modern CAS.

Conclusion

Dubbed the forgotten war, the CBI Theater received the least scrutiny from World War II historians. In general, historical analysis of the CBI Theater recounted individual tales of air-to-air combat, the significant airlift of supplies "over the Hump" to China, or the grueling jungle conditions facing soldiers in the Burmese jungle. Similarly, most attempts to document the development of modern CAS focus on either German innovation during the Interwar period or Allied actions in the European theater. Overlapped, these gaps obscured Allied CAS efforts in Burma from significant historical analysis.

This analysis recounted the experiences of the AVG and the EAC, and illuminated the CBI Theater's profound influence on the development of modern CAS. An evaluation of the Allied defense of Burma in 1942 revealed a small, antiquated, deeply fragmented force incapable of providing CAS to beleaguered ground units. Technological, personal, strategic, and doctrinal failings produced unresponsive, ineffective, segmented, and fratricidal CAS. The reader should not interpret this evaluation as a condemnation of the heroic actions of air and ground forces in Burma in 1942. Instead, the evaluation indicates the extreme complexity facing military planners

as they set out to invent a modern CAS structure in an extremely unforgiving environment while facing Imperial Japan's main attempt to isolate Free China from the Allies.

The fall of Burma, however, corresponded with a complete transformation of the US Army Air Force's approach to aviation in support of ground troops. New doctrine, focused strategic guidance, and increased resourcing rapidly transformed the air war in Burma. Admiral Mountbatten's integration of US Army Air Force and RAF units into the Eastern Air Command set conditions for a cohesive integration of the air-land team fighting in SEAC. Unified control, trained liaisons, improved radio communications, established procedures, and more aircraft combined to produce a stunning responsive, effective, integrated, and doctrinally-sound CAS force. From Admiral Mountbatten's collocated headquarters to the 88th Fighter Squadron's briefing room at Myitkyina, air and ground commanders planned, executed, and exploited joint opportunities. Along the way, SEAC forces defeated the Japanese Fifteenth Army, destroyed the Japanese 5th Air Division, and opened key air and ground supply lines to China.

Through operational integration and tactical innovations, the 1943-1944 Burma campaign created the modern CAS paradigm. Current doctrine adheres to this paradigm, and leverages new technology to make CAS even more responsive, effective, integrated, and doctrinally sound. Simply put, a joint force cannot survive on a modern battlefield without effective CAS. While training to face the hybrid threats of the future, the joint, multinational forces must continue to exercise and improve the doctrine, competence, and equipment required to operate in the CAS environment. Failure to do so would create conditions in which the only answer to the British JTAC's radio call, mentioned in the introduction, might be deathly silence.

Given the relatively untouched nature of CAS in the CBI Theater, opportunities abound for future study. In researching this analysis, four particular subjects arose as interesting potential topics. First, a thorough comparison of CAS in North Africa versus CAS in Burma could provide interesting insights into the operational command and control of tactical airpower. Second, given the overwhelming success of CAS in Burma, an investigation into the decay of CAS between the

end of World War II and the beginning of Korea could carry important lessons for a contemporary joint force facing significant financial constraints. Third, a comparison of the collapse of German and Japanese CAS forces as the war progressed might reveal poignant lessons about the requirement and value of joint training. Fourth, the legacy of the AVG's impact in Burma and in China might offer a unique window into the modern Chinese perspective on the use of asymmetric force multipliers such as cyber-warfare. Any of these research avenues could prove extremely interesting for contemporary military planners.

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